

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for detection and measurement of a targeted biological sample, comprising the steps of:

- providing a multiplicity of optically encoded microbeads,
- providing said optically encoded microbeads with a capture ligand,
- providing said optically encoded microbeads with bioagent-specific antibodies,
- containing said optically encoded microbeads thereby providing contained optically encoded microbeads,
- adding a sample to said contained optically encoded microbeads, said sample possibly containing the targeted biological sample,
- placing said contained optically encoded microbeads and said sample in a mixing holder for sufficient time for the targeted biological sample to adequately bind said optically encoded microbeads,
- adding fluorescent labeled antibodies to said contained optically encoded microbeads and said sample for attachment to said bioagent-specific antibodies,
- attaching at least some of said optically encoded microbeads to a disposable capture substrate containing an array of individual attachment sites for attaching said optically encoded microbeads thereto wherein each individual attachment site captures a single optically encoded micro bead with capture ligand, bioagent-specific antibody, fluorescent labeled antibody, and any targeted biological sample,
- washing said substrate and attached optically encoded microbeads,
- inserting said substrate into an optical detection system, and
- optically decoding said optically encoded microbeads for detection and measurement of the targeted biological sample.

2. (Currently Amended) The method of Claim 1, wherein said step of containing said microbeads is carried out by placing said optically encoded microbeads in a cuvet.

3. (Currently Amended) The method of Claim 1, additionally including the step of vibrating said mixing holder during said time said contained optically encoded microbeads are placed therein.

4. (Currently Amended) The method of Claim 1 additionally including the step of designing each of said array of attachment sites on a dipstick to capture a single optically encoded microbead.

5. (Previously Presented) The method of Claim 1, additionally including the step of locating said patterned array of attachment sites on said substrate at a spatial distance between each said array as determined by a resolution of said optical detection system.

6. (Previously Presented) The method of Claim 1, wherein said step of washing said substrate is carried out to improve the sensitivity of the detection process by removing from the substrate surface all unbound biological constituents and reducing the background solution fluorescence.

7. (Currently Amended) The method of Claim 1, ~~wherein said step of containing said microbeads is carried out by~~ including the step of placing said optically encoded microbeads in a disposable bead pack.

8. (Currently Amended) The method of Claim 1, additionally including the steps of providing each said optically encoded microbead with a different color and providing each said optically encoded microbead with a substrate capture point ~~and an assay~~.

9. (Cancelled)

10. (Withdrawn) In a portable pathogen detection system using a liquid array multiplex detection basis, the improvement comprising:

a disposable capture substrate containing a patterned array of attachment sites to which processed microbeads containing at least a target sample are attached for optical detection of the microbeads.

11. (Withdrawn) The improvement of Claim 10, wherein said patterned array of attachment sites are designed to attach thereto a single processed microbead.

12. (Withdrawn) The improvement of Claim 10, wherein said patterned array of attachment sites is formed such that the attachment sites have a spatial distance therebetween as determined by resolution of an optical detection system.

13. (Withdrawn) A portable pathogen detection system, comprising:  
at least one bead pack containing optically encoded microbead reagents,

at least one disposable capture substrate array of microbead attachment sites thereon, and

an optical analyzer into which said substrate is adapted to be inserted.

14. (Withdrawn) The system of Claim 13, wherein said at least one mixing chamber is located in a vibration unit.

15. (Withdrawn) The system of Claim 13, wherein said optically encoded microbead reagents include a capture ligand and bioagent-specific antibodies for attachment to target species.

16. (Withdrawn) The system of Claim 13, wherein said optical analyzer includes a reaction chamber for insertion of a substrate therein, and optoelectronics for optical assay detection and decoding of microbeads attached to the substrate.

17. (Withdrawn) The system of Claim 13, wherein said optically encoded microbead reagents in said at least one bead pack contains particular sets of target-

specific microbeads providing for highly multiplex detection from a single sample volume.

18. (Withdrawn) The system of Claim 17, wherein each of said microbeads contains a capture site and a fluorescent, target-specific assay.

19. (Withdrawn) The system of Claim 18, wherein said fluorescent, target-specific assay may be composed of any liquid array detectable biological species.

20. (Withdrawn) The system of Claim 13, wherein said ordered array of attachment sites on said at least one substrate is constructed to attach only a single microbead on each attachment site.

21. (Withdrawn) The system of Claim 13, wherein said ordered array of attachment sites on said at least one substrate are patterned with a spatial distance between sites as determined by a resolution of an optical detection system of said optical analyzer.

22. (Withdrawn) The system of Claim 13, wherein said optical analyzer includes a reaction chamber where said substrate is at least washed.

23. (Withdrawn) The system of Claim 13, including a plurality of bead packs and a plurality of substrates.

24. (Withdrawn) The system of Claim 13, wherein the array is selected from the group consisting of ordered arrays and disordered arrays.

25. (Withdrawn) The system of Claim 13, wherein the disposable capture substrate is provided with openings in which the microbeads are captured, with the openings selected from the group consisting of a series of wells and a series of channels.

26. (Withdrawn) The system of Claim 13, wherein the disposable capture substrate is provided with magnetic or electric capture pads, and wherein the microbeads include magnetic or electric charges.

27. (Withdrawn) The system of Claim 26, wherein the charged microbeads are optically encoded.

28. (Withdrawn) The system of Claim 13, wherein the disposable capture substrate includes a microbead capture filter.

29. (Withdrawn) A method for pathogen detection comprising:  
containing optically encoded microbeads,

adding a sample and capture ligand to the contained microbeads,  
adding fluorescent labeled antibodies for attachment to the microbead bound sample,

inserting a disposable capture substrate containing an array of attachment sites into the contained microbeads for capturing the microbeads, and  
inserting the disposable capture substrate into an optical detection system for optically decoding the microbeads for identification and measurement of the target biological molecules.

30. (Withdrawn) The method of Claim 29, additionally including placing the contained microbeads in a mixing holder for sufficient time for the targeted biological sample to adequately bind the microbeads.

31. (Withdrawn) The method of Claim 31, wherein placing the contained microbeads in a mixing holder is carried out prior to adding fluorescent labeled antibodies.

32. (Withdrawn) The method of Claim 29, additionally including washing the disposable capture solution and attached microbeads.

33. (Withdrawn) The method of Claim 29, wherein capturing the microbeads is carried out by physical, magnetic, and electrical capturing.

34. (Withdrawn) The method of Claim 29, wherein said array of attachment sites define a patterned array.

35. (Withdrawn) The method of Claim 29, wherein said array of attachments sites define an ordered array or a disordered array.

36. (Currently Amended) The method of Claim 1, additionally including the step of providing said contained optically encoded microbeads from the group consisting of optically encoded optically encoded microbeads, charged optically encoded microbeads, and optically encoded microbeads with optically encoded shells.

37. (Currently Amended) The method of Claim 1, wherein said step of attaching said optically encoded microbeads is carried out in an ordered array.

38. (Currently Amended) The method of Claim 1, wherein wherein said step of attaching said optically encoded microbeads is carried out in a disordered array.

39. (Currently Amended) The method of Claim 1, wherein said step of attaching said optically encoded microbeads to a disposable capture substrate is carried out by providing said substrate with a plurality of wells or an array of channels.

40. (Currently Amended) The method of Claim 1, wherein said step of attaching said optically encoded microbeads is carried out by an array of magnetic or electrode capture pads.

41. (Currently Amended) A method for detection and measurement of biological molecules, comprising the steps of:

providing a quantity of optically encoded microbeads,  
adding a capture ligand to said optically encoded microbeads,  
adding bioagent-specific antibodies to said optically encoded microbeads,  
containing said optically encoded microbeads thereby providing  
contained optically encoded microbeads.

adding a sample to said contained optically encoded microbeads, said sample possibly containing the biological molecules,  
adding fluorescent labeled antibodies for attachment to said bioagent specific antibodies,  
providing a disposable capture substrate containing an array of individual attachment sites for attaching said optically encoded microbeads thereto,  
inserting said disposable capture substrate containing an array of individual attachment sites into said contained optically encoded microbeads for capturing said optically encoded microbeads wherein each individual attachment site captures a single optically encoded micro bead with capture ligand, bioagent-specific antibody, fluorescent labeled antibody, and any targeted biological molecule,  
washing said substrate and said optically encoded microbeads,  
inserting said disposable capture substrate into a detection system, and  
optically decoding said optically encoded microbeads for identification and measurement of the biological molecules attached to said optically encoded microbeads.

42. (Currently Amended) The method of Claim 41, additionally including the step of forming said contained optically encoded microbeads to be optically encoded.

43. (Currently Amended) The method of Claim 42, wherein said step of decoding of said optically encoded microbeads is carried out in an optical detecting system.